AVIATION

AUGUST 21, 1922 Issued Weekly PRICE 10 CENTS

The Besson Four-Engined Quadruplane Flying Boat

VOLUME XIII
Number 8

Four Dollars a Year

SPECIAL FEATURES

NEW JAPANESE MILITARY AIRPLANES
DESIGNING LANDING GEAR SHOCK ABSORBERS
DETROIT AERO CONGRESS
GORDON BENNETT BALLOON RACE

THE GARDNER, MOFFAT CO., INC.
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK

Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office at Highland, N. Y., under Act of March 3, 1879.

AUGUST 21, 1922

AVIATION

VOL. XIII. NO. 8

Member of the Audit Bureau of Circulations

CONTENTS

THE GARDNER, MOFFAT COMPANY, Inc., *Publishers*
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK

Subscription price: Four dollars per year. Single copies ten cents. Canada, five dollars. Foreign, six dollars a year. *Copyright 1922, by the Gardner, Moffat Company, Inc.*

Issued every Monday. Forms close ten days previously. Entered as second-class matter Nov. 23, 1920, at the Post Office at Highland, N. Y., under act of March 3, 1879.

L. D. Gardner, President
W. D. Moffat, Vice-President
W. I. Seaman, Treasurer
George Newbold, Business Manager

AVIATION

Ladislas d'Orcy, Editor
Virginius E. Clark
Edward P. Warner
Ralph H. Upson
Contributing Editors

Vol. XIII AUGUST 21, 1922 No. 8

Responsibility for Airplane Accidents

THE publicity given one airplane accident by newspapers is usually many times the space given to any successful achievement of aircraft; and in just the same manner is the mind of the public influenced As practically all the accidents that happen to civilian aircraft might have been prevented it is a crucial point to determine who or what is responsible for the continuation of these crashes

Inspection and regulation are the two imperative needs of commercial aviation today Federal legislation is the only remedy And this necessary legislation is being held back because the Congressmen in Washington will not get together on some sort of bill to regulate flying The Wadsworth Bill for this specific purpose passed the Senate last February It is now reposing peacefully in the Committee of Interstate and Foreign Commerce awaiting its turn to come up for hearing Meanwhile deaths occur from the use of machines that never should take the air and from the misuse of airplanes through ignorance or worse.

Until some law is passed placing the control of flying somewhere there will continue to be accidents and the responsibility will be due to the delay in providing federal regulation. Every official who blocks progress will share the responsibility for these accidents. Chairman Winslow, in whose committee the Wadsworth bill now rests, has a great responsibility and also a great opportunity

Get Back to Fundamentals

IT is probably a human failing, in engineering as well as politics, to seize upon catch words. It is the lazy man's way to avoid working a thing out to its fundamental principles, the ignorant man's substitute for real knowledge, the prejudiced man's expediency to satisfy his own conscience. There is no such thing as intrinsic merit in some particular form of government, without reference to the people who compose it and those whom it is to serve. There is likewise no way of judging the merit of some particular construction without reference to the materials used and the purpose intended

The above may sound very platitudinous, but it is remarkable how much reliance in aeronautics seems to be put on mere types. It is as if bridgebuilders should discuss the relative merits of the cantilever, the suspension, or plate girder type of construction without reference to what it is to be made of or where it is to be used. Yet the same men who would ridicule such a controversy are prone to speak of the biplane, or the internally braced monoplane,—the semi-rigid or the rigid type of airship as if the mere words were magic wands with some occult power for good or evil

The fundamental question is not "What type is it?" but "What are you going to do with it?" With this as a criterion, and sound engineering as a working basis, the designer will do well to forget about the "type" till the job is done. Finding a name for it is a mere detail

Why the Mooring Mast?

THE airship mooring mast serves at least one useful purpose, that of keeping the ship headed approximately into the wind. But are modern airship engineers so lacking in resource that they have to swing the ship from the top if a tall mast or tower to achieve this simple result? We must admit that a mast would be almost necessary for an emergency mooring over rough country or in the heart of a city. But most of the masts hitherto erected or planned seemed to be located at some regular air station having a large flat field available In a case like this there would seem to be greater advantages in a low mooring, practically on the ground.

One often hears the argument that "proper freedom of motion must be allowed in the ship's vertical angle as well as direction directionally" But for what purpose? There is not enough vertical component in the wind near the ground to cause serious aerodynamic forces, except indirectly due to shock. But shock is possible only where there is motion. Hence the vertical motion allowed at a mooring mast is the cause of the very thing it seeks to combat. Why not get the ship down as close to the ground as possible and hold it there rigidly, as far as vertical motion is concerned?

Who's Who In American Aeronautics

THE appreciative comment that has been received about the first edition of "Who's Who in American Aeronautics" has been extremely gratifying The omission of some of those biographies that should have been included, could they have been secured, was inevitable but every effort was made to make them available

The second edition which will be published early in 1923 should contain many additional sketches of men who are actively interested in flying in the United States. Every pilot is invited to send a sketch of his career in condensed "Who's Who" form. It is impossible to secure addresses in all cases so this opportunity is taken to reach those who would otherwise be overlooked.

It is too early to establish definite rules for inclusion in the book. Everyone who flies should have available a reference work which acquaints him with others who are in the industry or interested in commercial aviation or the sport of flying.

You will be assisting the general good of aeronautics in the United States by sending in your biography.

New Japanese Military Airplanes

Interesting Particulars of Four Military Ships of Japanese Manufacture and Design

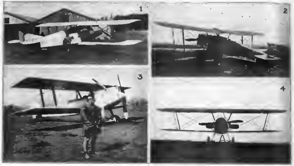


Fig. 1. Akita biplane Fig. 2 Mitsubishi single-seater pursuit machine Fig. 3. Kawanishi 3-seater Fig. 4 Shirata single-seater pursuit machine

The illustrations of Japanese military aircraft appearing on this page, which have just reached this country from Japan, afford an interesting insight into the progress made by Japanese aircraft constructors in the last year or so.

It is not so very long ago when pictures of Japanese airplanes showed them to be very primitive affairs indeed, and as if to bear out this impression accidents to Japanese pilots were frequently reported. That Japan has outgrown this stage and that it is making rapid strides toward building up an efficient air force, manned by a skilled personnel and backed by an industry relying on national resources, is shown by various indications. During the past year numerous long distance flights have been made by Japanese Air Force squadrons, the Imperial Army maneuvers were held with both parties disposing of up to date quotas of observation, pursuit and bombing airplanes, and much attention was also devoted toward building up Japanese naval aviation.

The illustrations on this page are believed to be the first published in this country of up to date Japanese military aircraft of *Japanese manufacture* While sundry British, French and German influence is still apparent in the design of these machines, they nevertheless disclose a certain originality which unmistakably stamps them as the forerunners of really original Japanese aircraft

While the information regarding the characteristics of the machines illustrated is incomplete, it reveals enough in connection with the photographs to obtain a fairly comprehensive understanding of the possibilities of the different types. The Akita biplane illustrated in Fig 1 is apparently a single-seater pursuit plane, showing some English influence and having for characteristics the following Length 7 712 m., height 2.80 m., chord 1.525 m., total wing area 28 sq m., 220 hp. Maybach engine, total weight 1573 kg., high speed 180 km. p h

Fig 2 illustrates the 1921 model single-seater fighter produced by the Mitsubishi Dockyards, which shows unmistakable Breguet influence. Span 9 750 m., length 7.200 m., height 2.95 m, 300 hp. Hispano-Suiza engine, total weight 1000 kg This machine is armed with two machine guns and is equipped with emergency flotation air bags.

The Kawanishi 3-seater biplane shown in Fig. 3, with Mr. Sato, a well known Japanese civil pilot standing in front, is reminiscent in many respects of the German war-time L.V.G. two-seater fighter and corps observation machine. Its characteristics are Span 11.00 m, length 7.50 m, height 3 20 m., total wing area 31 sq m, 300 hp Maybach engine, high speed 140 km. p h

No particulars are on hand regarding the Shirato biplane illustrated in Fig 4 The caption on the photograph calls it "the most highest speed machine, civil aviation in Japan", but judging by its looks, reminiscent of the Spad XIII, the machine rather looks like a single-seater fighter

Perfect Air Mail Record

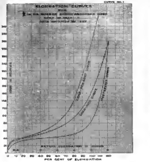
The transcontinental air mail service has had a perfect record for the past three weeks according to reports received by the Post Office Department from the three operating divisions. All three divisions had 100 per cent performance, which means that every plane flew as scheduled and that every flight was completed No plane was damaged by a bad landing or forced to undergo repairs.

Designing Landing Gear Shock Absorbers

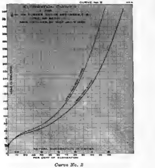
Practical Method for Determining the Size of Cord, Number of Loops, Tension, etc. for a Given Service

By Orrin E. Ross

There has been less research and fewer technical articles written on the design and construction of rubber shock absorbers for airplane landing gears than for any other department of aeronautical engineering The reason is not that engineers and designers regard the landing gear as unimportant or as a secondary factor to the safety and comfort of the occupants of an airplane Although considerable time and care is used in the stress analysis of the strut structure of the chassis, yet when a shock absorber is needed it is practically guessed at and then fabricated and tested. If the test is not satisfactory, the shock absorber is changed, either by using a different sized cord or by varying the initial tension or the number of wraps of the cord On the other hand, when the test is satisfactory to the persons making it, the shock absorber is used on the ship it is meant for, and, also, it is used on all other ships of the same design without any account being taken of the variation in the quality of the elastic cord. This is where the trouble lies, as will be seen later.



Curve No 1



Curve No. 2

The above method of design and construction is more popular on small airplanes weighing 2600 lb or less. The reason is that the cord can be wrapped directly on the landing gear assembly The method for larger machines is to have "bench wrapped" shock absorbers. The former style has more than one disadvantage; it is next to impossible to figure the number of loops of the cord or the desired initial tension, the loops are not the same size and therefore the strands will not have the same elongation, the cord being wrapped in more than one layer promotes chafing which effects the life of the shock absorber; also, it requires more time to change the cord than it would if the shock absorber was bench wrapped and could be removed as an assembly In fact, the only good quality about the old style "over and under" shock absorber is its lightness, which of course is an important factor in racing or military pursuit airplanes.

The primary object of this article is to deal with the actual design of a rubber shock absorber, but the writer takes the opportunity here to express his belief that all shock absorbers for racing and pursuit ships, as well as the larger and heavier type, should be made so that the characteristics and shock absorbing qualities of the rubber, when assembled, can be figured to a fair degree of accuracy.

Unequal Elongation

Due to the difference in the elasticity and elongation of different lots of the same kind and size of rubber cord, it is believed that every one who has anything to do with the designing, wrapping, inspection or changing in any way of an airplane shock absorber should know the characteristics of the particular cord he is using and should know how to calculate the necessary conditions to insure the safety of the ship as well as that of the pilot and the passengers. In other words, it is found by experiment that no two batches of cord of the same size will give the same elongation curve when plotting load in pounds against elongation in per cent or inches

Although this defect exists, it is nevertheless beyond the control of the manufacturer When ordering, one may specify a cord which shall have 100 per cent elongation for a given range of loads, but, when the cord is manufactured, it may be within the range or it may not. For instance, the United States government specification for landing gear shock ab-

sorber cord requires the following loads for 100 per cent elongation:—

Diameter of finished cord	Load in pounds
3/8	100 to 140
1/2	195 to 225
5/8	275 to 300

Considerable experience with cord bought under this specification has shown that the cord requires a greater load than the limits include, or that the rest of the loads required for various per cents of elongation are such that the curve plotted to the results is too straight. This shows that in the manufacture of the cord, the resiliency and shock absorbing qualities of the rubber have been sacrificed in order to meet the required load for 100 per cent elongation. In either case, it is necessary to know what the characteristics of the whole curve are in order intelligently to design a shock absorber. It is not enough simply to know what the loads are for 100 per cent elongation.

In order to make these points clear, we will solve a few problems in the actual design of the shock absorber. This method of calculation holds good for any size or weight airplane, but we will choose a fairly large one weighing, say 8700 lb. fully loaded.

Problem No. 1

We will assume that we are starting on a preliminary design. All we know is the weight of the ship, the points of attachment of struts and axle, the size of the wheel and the length of the hub and the conditions for which we want to analyze our stresses and reactions with their factors of safety. We know the style of shock absorber we intend to use, (a removable bench wrapped unit), but we do not know the number of loops nor the size of the cord we need. Neither do we know the distance between the shock absorber spindles which will give us the best elongation with an assumed axle movement of 4 in. at the shock absorber. We can arbitrarily use 1¼ in. diameter spindles and try ½ in. diameter cord to start with. We can assume that we have no cord on hand as we naturally will not know what kind of an elongation curve it will have. We can use a curve, however, that we had for cord on another ship and which we will call, here, Curve No. 1.

Although half the weight of the ship is only 4350 lb., due to the cantilever action of the wheel and the resolution of vertical and horizontal forces which we will not solve here, we find that the vertical reaction at the shock absorber or the force acting on the rubber is 4900 lb.

Let us proceed with the calculations as follows:—

Solving for the minimum distance between the spindles. See Fig. 1.

Data. Load—4900 lb.
Impact factor—4½
Ultimate load 22050 lb.
½ diameter cord
Elongation curve No. 1
Assume 68 strands or 34 loops

$\frac{4900}{68} = 72$ lb. per strand initial tension

72 lb. gives 54 per cent elongation (from curve)

$\frac{22050}{68} = 320$ lb. per strand maximum tension.

320 lb. gives 105 per cent elongation.

Length of one loop with axle at rest = $1\tfrac{3}{4}\pi + 2x = 5.5 + 2x$

Length of one loop unstretched = $\frac{100 \times (5.5 + 2x)}{154} = \frac{5.5 + 2x}{1.54}$

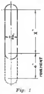


Fig. 1

Length of one loop at maximum deflection of rubber = $1\tfrac{3}{4}\pi + 2(x + 4) = 13.5 + 2x$.

Elongation $= 13.5 + 2x - \frac{5.5 + 2x}{1.54}$

$$\frac{13.5 + 2x - \frac{(5.5 + 2x)}{1.54}}{\frac{5.5 + 2x}{1.54}} = 105 \text{ per cent}$$

$X = 9.33$ in.

Now the assumptions in this preliminary example may not be the same as some other designer would choose. That is, another man may think 68 strands either too many or too few. In either case, he could try 70 strands or 64 strands and find that the result varies only slightly. Still another designer might think that a movement of 4 in. is not enough for the axle. But if he solves the problem in this case with a movement of 4½ or 5 in., he will find that the results would be so much greater that he might run into difficulties in construction or weights or stream lining possibilities. The size of the wheel and the length of the tread has a good deal to do with determining the size of the shock absorber because the general appearance is a factor to be considered as well as is weight and head resistance.

Problem No. 2

Then let us make it as small as possible for all these reasons. We can arbitrarily take the distance between the spindles to be, say 8¾ in. Then we will have to assume an initial tension and solve for the impact factor or vice-versa. The methods of computation in both cases are similar.

By decreasing the distance between the spindles, it is readily seen that there will be less rubber in a loop if the same initial tension is maintained and that, therefore, there will be a greater elongation if the movement of the axle is constant.

Solving for the impact factor necessary to deflect the shock absorber to its maximum position (see Fig. 2).

Fig. 2

Data 68 strands or 34 loops.
Initial tension, assume 72 lb. per strand which is enough to support the weight of the ship at rest.
72 lb. gives 54 per cent elongation.
Curve No. 1

Length of one loop with axle at rest = $1\tfrac{3}{4}\pi + 2 \times 8\tfrac{3}{4} = 23$ in.

Length of one loop unstretched = $\frac{100}{154} \times 23. = 14.92$ in.

Length of one loop at maximum elongation of rubber

$1\tfrac{3}{4}\pi + 2 \times 12\tfrac{3}{4} = 31.$ in.

$31 - 14.92 = 16.08$ = elongation

$\frac{16.08}{14.92} = 108$ per cent gives 350 lb. per strand tension

$\frac{23800}{4900} = 4.85$ impact factor.

Now, suppose we design our spindles and strut structure on this basis and order our material. When the shock absorber cord is received, we test it and run a curve which we will call Curve No. 2. Upon examination of the curve, it will be noticed that for the lower values of per cent there are relatively high load values, also, that the belly is not very pronounced, tending to make the curve a straight line. As the shock absorbing qualities of a cord exist between 20 per cent and 110 per cent elongation, it is necessary for it to have a great amount of resiliency which bows the curve out between these points. In short, the less elasticity in a substance the straighter the elongation curve. Steel gives a straight line curve.

If we use this rubber, starting with an initial tension of 72 lb. per strand and solve for the impact factor by the method shown above, we find that the result is 2.5. An impact factor of 2.5 is not sufficient, so we begin to cast about to

find a way to use this rubber. We try several greater values for the initial tension and still the impact factor is too small. We use 90 lb. per strand initial tension which would render the shock absorber of little or no use to the ship in taxiing and which would cause undue and probably dangerous vibration throughout the whole machine. Still with this high initial tension, the impact factor is only 3.88.

There are only two things left to do. One is to redesign the shock absorber to suit the cord, which would be a great expense if the drawings for the whole chassis were made and probably some of the parts already manufactured. The other is to order new cord. Let us assume that the latter is the thing to do in this case.

Problem No. 3

The curve for this new batch of cord will be called Curve No. 3. It will be noticed that for an initial tension of 72 lb. per strand, we get an impact factor of 3.8. This is not as bad as Curve No. 2, but still it is not what we desire. However, good results are obtained by starting with the desired impact factor of 4.5 and solving for the initial tension in the following manner:

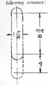


Fig. 3

Data Load 4900 lb.
Impact factor 4.5
Ultimate load 22050 lb.
68 Strands or 34 loops
Elongation curve No. 3
X = Initial tension in per cent.

$\frac{22050}{68} = 320$ lb. per strand

320 lb. gives 110 per cent elongation.

See Fig. 3
Length of one loop with axle at rest = 23 in.
Length of one loop at max. elongation of rubber 31 in.

Length of one loop unstretched $\frac{100}{1x} \times 23$ or $\frac{100}{210} \times 31$ in.

$$\frac{23}{1 + x} = \frac{31}{2.1}$$

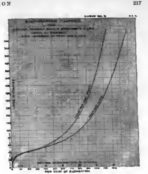
$X = \frac{17.25}{31} = 55.75$ per cent.

55.75 per cent gives 78 lb. per strand.

$78 \times 68 = 5300$ lb. This is more than the load on the rubber and is not conducive to the easiest riding qualities of the ship in taxiing, but it is not excessive and is the most preferable condition under the circumstances.

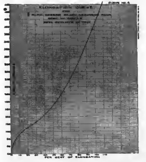
It may be stated here that the ideal condition for a new shock absorber is to wrap it with an initial tension slightly greater than enough to support the ship at rest and to have the greatest tension enough to give an impact factor slightly greater than the actual desired one. The reason for this is that the rubber, at first, suffers a slight depreciation or acquires a permanent set which tends to loosen the rubber to its proper initial tension and also lessens its impact factor to the proper amount.

These examples will demonstrate to the reader that it is not enough to know the load required by a cord to produce 100 per cent elongation. We must know all the loads for all the per cents of elongation. Whether a man is an engineer, a designer, a shop or field superintendent, a foreman or a mechanic, it is well for him to know all the characteristics of a rubber cord before wrapping a shock absorber. It is not enough to wrap a shock absorber with an initial tension that will support the ship when standing still and take a chance on the tension which will exist when the axle moves to its maximum position. The cord may be such that the initial tension would have to be greater than that which will barely support the ship in order to secure the maximum tension that will produce the proper impact factor.



Curve No. 3

To carry our argument a little further and to prove that different lots of the same kind of cord are not suitable for the same shock absorber, let us suppose that our airplane is



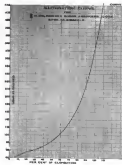
Curve No. 4

completed and in the field. Suppose that the shock absorbers need renewing and that the store house at the field has only ⅝ in diameter cord. The average mechanic would probably wrap the shock absorbers by guess and as long as they supported the ship at rest without deflection he would take a chance on them absorbing the shocks properly. Instead, if he would take a pencil and paper and figure it out, he would probably get results as follows:—

34 loops of ½ in cord occupy 17 in. of spindle

17 in. of ⅝ in. cord would be $\frac{17}{5/8}$ or 26 loops.

26 loops = 52 strands.



Curve No 5

Curve No 4 shows us that this cord has very little resiliency and our figures will show that it is of little or no value for our shock absorber If we solve for an impact factor by starting with an initial tension per strand of $\frac{4900}{52}$ or 94¼ lb. which gives an elongation 12 per cent, we get a result of 1 49 Such an impact factor is of course not to be considered.

Again, if we start with an impact factor of 4.5 and solve to see what our initial tension must be, we find that it is 178 lb per strand 178 × 52 = 9250 lb. This would be very similar to using hemp for a shock absorber or fastening the axle directly to the struts.

Consider that another reel of cord can be produced from the store room which will give an elongation curve like Curve No 5 Our ship would be flying in a short time By starting with an initial tension sufficient to support the load and solving for the impact factor, we will get a result of 4 87, which is considered good.

Another thing, we can facilitate fabrication to an appreciable degree by calculating the total length of our cord and making up our ends before wrapping That is, the length of the cord for each shock absorber is the length of one loop, unstretched, times the number of loops, plus the amount it takes to go around the thimbles or loops at the ends.

International Air Convention

Fourteen states having on June 1, last, deposed the act of ratification of the Convention for the Regulation of Air Navigation with the French Minister of Foreign Affairs, the convention came into force with respect to these states on July 11. The ratifying states are the following Belgium, Bolivia, British Empire (including Canada, Australia, New Zealand, South Africa and India), France, Greece, Japan, Portugal, Serb-Croat-Slovene Kingdom and Siam In addition the following states, which were not signatories to the Convention originally, have adhered to it. Persia, Peru, Liberia and Nicaragua Consequently the International Air Convention is now in force in eighteen sovereign states or dominions.

In accordance with the terms of the I.A C the French government convened on July 11 (forty days after the act of ratification) the International Commission for Air Navigation. This commission has the power to change by a three-quarter vote any provision of any of the annexes to the convention These annexes deal with the following subjects (A) The Marking of Aircraft. (B) Certificates of Airworthiness. (C) Log Books. (D) Rules as to Lights and Signals, and Rules of the Air (E) Qualifications Necessary for Obtaining Pilot and Navigator Certificates. (F) International Aeronautical Maps and Ground Markings. (G) Meteorological Information (H) Customs

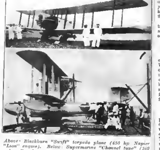
Lieut. Hinton on Flight to Brazil

Lieut Walter Hinton and four companions left New York on the morning of Aug 16 in the HS12 Sampaio Correia, on their long flight to Rio de Janeiro, Brazil, to attend the Brazilian Centennial Exposition

It is understood that the flight is being made under the auspices of the New York *World* and Pathe News

Lieut. Hinton expected to reach Manteo, on Roanoke Island, N C, a distance of 400 miles, on the first day of his journey

Japanese Naval Aircraft



Above: Blackburn "Swift" torpedo plane (450 hp Napier "Lion" engine). Below: Supermarine "Channel type" (160 hp. Beardmore engine) combat-observation flying boat Both machines are of British manufacture

Preparing for the Detroit Aero Congress

Thirty-Nine Entries in Land and Water Speed Events Announced by Detroit Aviation Society

There have been many aviation conventions and flying meets held in the United States since the Wright brothers made the first flight in 1903, but the Second National Aero Congress and airplane races to be held in Detroit in October give every indication of being the most significant and vitally important aeronautical gathering yet held in the history of American aviation Divided into two parts, the aero congress will present to the citizens and visitors in Detroit not only the national convention of all the various elements in aviation but the most remarkable series of airplane races yet held in this country and, possibly, abroad It is the expressed intention of foreign governments to send offical observers to Detroit to make notes on the races, so that the meet is recognized as of international importance.

This, at least, was the assumption of Sidney D Waldon, president of the Detroit Aviation Society, when he sent invitations to all governments suggesting that they send their best flying machines and pilots to compete against the large field of American entries, entries by the way, which have already been officially entered. While the complete list has not been announced, due to the number of weeks remaining for new entries, more than forty of the latest designs yet built, are being assembled in various aircraft factories throughout the country for their appearance several weeks before the races. Typical among the letters received by the head of the Detroit Aviation Society, which, is that from Secretary of War John W Weeks. It reads

War Department
Washington

July 26 1922

Mr. Sidney D Waldon,
President, Detroit Aviation Society, Inc,
4612 Woodward avenue, Detroit, Michigan.
My dear Mr. Weldon —

"Referring to my letter of March 24, concerning the entry of the Army in the air events to be held under the auspices of your Society, I am now pleased to inform you that this project has been definitely appoved and the Chief of Air Service has been directed to communicate to you the events in which the Army will participate.

"I wish to take this occasion to express to you my appreciation of the work that your Society is doing in the interest of aerial activity and the wish that your coming meet will be successful in all of its varied program

Yours very truly,
(Signed) John W Weeks,
Secretary of War.

Many letters similar in tone and expressing the same kind of whole-hearted appreciation, have been received by Mr Waldon. It has been know for several years that the holding of an aviation meet demands not only the attention of a few interested individuals, but the cordial and practical co-operation of the entire community. Where entire communities have supported legitimate aviation enterprises, they have been successful Where municipal and public co-operation has failed or lagged, there will be found the record of dismal failure and consequent loss of public confidence in all aviation.

Five Principal Events

Five principal events are scheduled for the national airplane races The first will be held on Lake St. Clair Saturday, October 7, a few days in advance of the land races which will be held at Selfridge Field, Mt Clemens, Mich. The chief event on Lake St Clair will be the Curtiss Marine Flying Trophy Race. The distance to be flown is approximately 160 miles—eight times around a closed triangular course of 20 miles with the longest leg of the course paralleling the Detroit shore northeast from the starting point near Belle Isle So far there are eleven entries for that race

The Detroit Aviation Society has headquarters at 4612 Woodward avenue, and there the executive staff handling the events, as well as the national convention, is preparing to handle the visitors which will invade Selfridge Field Oct. 12, 13 and 14, the days of the over-land races. Two of these are on the twelfth, the Detroit News Aerial Mail Trophy race for large capacity, multi-motored airplanes, and the Aviation Country Club of Detroit Trophy race for light commercial airplanes. On the thirteenth the Liberty Engine Builders' Trophy race for observation type (2-passenger) planes will be held Other aerial exhibitions and contests will be held; and in these the First Pursuit Group at Selfridge Field will play no small part. Maj. Carl Spatz's command at Selfridge is the nucleus for the advanced fighting air force of the entire Army It is being built up rapidly and equipped with new planes which are arriving as produced.

The Pulitzer Speed Classic

Of all the races the premier event will be the Pulitzer Trophy Race on Saturday, Oct. 14, when some of the fastest planes ever built will compete in what has become to be known as the American speed classic. There are twenty-eight entries to date for the Pulitzer race Both the Army and Navy have entered their latest machines, a majority of which are now being constructed secretly in various aircraft plants. It is confidently predicted that more than one world's record will be broken this year. The course, which is the same for all of the over-land races, starts from Selfridge Field and extends to Troy Corners down to Packard Field and thence back to Selfridge, a triangular course of approximately 40 miles, which the Pulitzer contestants must fly four times, or 160 miles, non-stop.

The winners of last year's Pulitzer contest at Omaha, Neb averaged 176.7 m.p.h for the entire race. Many of the machines entered this year are expected to make in the neighborhood of 200 m.p.h. Such a speed means that the pilots will fly their ships at the rate of 300 ft. a second and because they must round each point in the course within 500 ft. of the ground, for practical purposes they will continually have to keep about that altitude.

Other pilots expect to fly to the races from various cities. Many of them are delegates to the convention, which will equal in importance the races, because for the first time in America, all the elements in aviation are convening to organize a permanent national aeronautic association which shall represent the national thought and the ideas of all individuals —both commercially and for the national defense.

The local men who have been interested in aviation for years endeavored last year to sound out public sentiment nationally, with a view toward conducting the 1921 national races in Detroit But there was insufficient response. The enthusiasm was there, but it was scattered. The government, practising economy which the times had forced upon it in all branches, was unwilling to offer support to a venture which it recognized must be supported from all angles in order to be successful The airplane industry, lacking a civilian market and with its government orders curtailed to a minimum, obviously could not contribute much to a flying meet. The Detroit Aviation Society, therefore postponed its meet until co-operation could be assured.

Thorough Preparation for Meet

Starting more than six months ago, the Detroit Aviation Society went East, West and South, scanding public feeling, national sentiment and the state of the aeronautical industry It was found that the American people are beginning to accept flying as a practical means of communication, travel and transport. The administrative heads of State governments were taking official notice. Legislation was being passed or

considered to regulate flying. Moreover the federal government had repeatedly asserted its recognition of the importance of the airplane, its influence on our national life and above all the urgent need of developing aviation as a means of national defense. Our observers abroad had reported increasing activity on the part of foreign governments which through their air ministries, departments of war and marine, had set their best designers at work developing planes for every conceivable military and naval use.

There are expectations that Great Britain will send one or two planes to participate in the Detroit races, but it is rumored among the attaches in Washington that if foreign governments do not enter their planes in the national races, it will be for the sole reason that they do not want to display their latest designs here and thereby help stimulate American aircraft development.

Among the entries so far confirmed are twenty-eight different types, so designed that they may be produced in quantity for any emergency in war or peace. With three exceptions they have never before had an opportunity to match their performance with other craft. Practically every new aero engine of recent development will perform in the Detroit races.

Detroit Planning for the Future

It requires no further explanation to show the reader where Detroit's interest lies in the national airplane races. Detroit took the lead in the motor car industry because it was in Detroit that men of vision and confidence saw its possibilities. A majority of those visualize the vast, limitless future of the airplane. They know that with its development will come factories, plants, shops, airports and service stations built especially for aviation purposes. The city that prepares itself to accomodate the demand for these auxiliaries will the more quickly establish itself on the air map of the nation.

The Detroit Aviation Society is handling the local arrangements for the convention, its committees being the same as for the races. They include:

Sidney D. Waldon, President
H. W. Alden, Vice-President
Mason P. Rumney, Secretary
Wm. E. Metzger, Treasurer
Harold H. Emmons, Counsel

Directors

H. W. Alden	Angus McLean
Chas. T. Bush	Wm. E. Metzger
Howard E. Coffin	E. LeRoy Pelletier
Harold H. Emmons	Mason P. Rumney
Edsel Ford	Wm. E. Scripps
W. H. H. Hutton, Jr.	Jesse G. Vincent
Henry B. Joy	Sidney D. Waldon

C. Harold Wills

Finance Committee

H. B. Joy, Chairman
Chas. T. Bush, Vice-Chairman

J. Lee Barrett	William Lerchen
Roy D. Chapin	Eugene W. Lewis
Harold H. Emmons	Edward A. Loveley
Fred J. Fisher	Wm. E. Metzger
E. P. Hammond	Chas. B. Van Dusen
Robt. C. Hargreaves	Jesse G. Vincent
Earl Holley	C. S. Mott
Dr. J. W. Inches	Sidney D. Waldon

Wm. Walker

Chairman of Committees

Rules and Entries	Scoring and Timing
Sidney D. Waldon	Harry H. Knepper
Publicity	Medical
E. LeRoy Pelletier	Dr. Angus McLean
Fields, Course and Supplies	Referees
C. G. Edgar	Coleb S. Bragg
Technical	Reception and Entertainment
H. M. Crane	Howard E. Coffin
Judges	Water Derby
H. W. Alden	Wm. E. Metzger

Starter—Eddie Rickenbacker

American Glider Successful

The success of Edmund L. Allen of the Massachusetts Institute of Technology at Clermont Ferrant with his American built glider places in the front ranks of glider pilots.

The first day he flew 3 min. 19 sec. in four flights, maintaining complete mastery of control and maneuvering in the wind.

The next best effort was that of Switzerland, whose representative remained in the air for a total period of 1 min. 44 sec.

The scientific results obtained by Allen's flights are extremely noteworthy in the field of motorless aircraft, in the opinion of Prof. Edward P. Warner of the Massachusetts Institute of Technology. It is his opinion that the American glider, if equipped with a five horsepower motor, can take the air at any time and from any given position, whether flat lands or hills. Well known pilots like Boussotrot, Paulham, Coupet and Sardier agreed with this opinion. All said that Allen's control of the machine was the best ever seen.

Allen in his performance gained in altitude from the taking off point and took advantage of every gust of wind. He did not attempt to make a record duration flight, as he was greatly concerned with the irregular contour of the ground, poles, sunken roads and other impediments. He picked out good spots for landing. In none of his flights did he lose more than thirty feet of altitude from the taking off point to landing.

Allen's flights, which were made in a breeze varying from twenty to twenty-five miles an hour, were taken from the smaller hill, along Mount Combegrasse. In one instance the aeonoplane gained nearly fifty feet in altitude over the starting point, but the wind falling temporarily the pilot had to make a nose dive in order to get up speed.

The American machine was launched by a rope which was attached to a hook so contrived that the rope was automatically released when the machine left the ground. The pilots of the French machines have decided to adopt a similar launching device, as it is considered the most practical, the American machine requiring only fifteen to twenty feet on the ground before soaring, while Boussantrot in his attempts yesterday needed more than fifty feet.

The experts who have been on the field since the opening of the contest are in agreement that the standard type of gliders, built along the lines of the lighter airplanes, with increased lifting capacity and reduced weight, have had the better of the argument over the "freak" machine. None of these latter has succeeded in taking off, the "bats," the "flying fish" and the "flappers" remaining on the ground unable to make any but the shortest hops and showing no stability in the air.

Peterson, N. J. August 8, 1922

Editor, AVIATION —

The article on soaring flight by J. W. Miller in the issue of July 31 AVIATION is very interesting and particularly the analogy of lift imparted to a soaring machine by sudden gusts to a ball on a series of inclined planes.

But the summation of his statements into a theory of straight upward motion gives the doubt to the application. There is no possible doubt that action of this sort is observable in bird flight. At least it has been the writer's privilege to see a small specie of hawk hang poised over a spot on a perfectly level stretch of field, headed directly into a more or less steady wind and not lose height for two or three minutes, yet with no visible effort except that of balancing.

To question Mr. Miller's explanation, of possible hovering or straight vertical motion, I beg to put it as follows.

If the position of the "'CG' is far enough in advance of the center of pressure so that the forward component of the force vector along the path of flight just equals the drift," then obviously the path of flight must, in relation to the assumed horizontal flow of wind be *downward*, i.e., must be a "glide" as indicated in the first part of the hypothesis, (all our forces are hereby disposed of). And being a glide downward, on what basis can we possibly hope that the machine will "merely drift upward" by assuming a "wind blowing hard enough?"

WALTER L. WEEKS

Eliminating the Airline Hangar

Reducing Investment in Buildings and Overhead by Mooring Weather-Proof Airplanes in the Open

By Archibald Black
Consulting Engineer, Garden City, N. Y.

In any plans for operation of freight or passenger airlines on a comprehensive scale, the hangar has a very doubtful place, if indeed, it has any logical place there. If the airplane and airship are regarded as means of transport rather than as the toys of wealthy sportsmen, it becomes inconsistent to continue housing these when not in actual use, or undergoing inspection or overhaul. Steamships, railroad cars and power boats are probably the best comparisons which can be made with commercial aircraft. None of these are housed while out of service. Each is sufficiently waterproofed to withstand exposure to the weather and is left out in the open at all times.

Automobile a Poor Comparison

The automobile, to which the airplane is so frequently and so illogically compared, forms a very poor comparison. The automobile is essentially an individually owned vehicle. The airplane is essentially a vehicle which requires a complete organization in back of it, as does the locomotive. It does not adapt itself well to individual operation.

How the flying boats of Aeromarine Airways are kept on shore for purposes of overhauling—an instructive demonstration of the sturdy, weather-proof qualities of these craft

All passenger cars, and even many light trucks, are very highly finished on account of the close inspection to which they are subjected by those passed or passing them on the public streets. This close contact puts the passenger car, more or less, "on exhibition" at all times. It is something which no other class of vehicle today has to contend with. As a consequence, passenger cars are turned out with a finish and polish beyond comparison with any other type of vehicle. Exposure to the weather is very injurious to this finish, so the practice of housing all passenger cars and most trucks, when not in use, has become the custom.

In addition to this consideration, the automobile is used largely in cities where it is not practicable to leave it on the public street at all times and, the space which it occupies being comparatively small, the cost of housing it in a garage is not excessive. It is quite customary for trucks to be left out in the open in cases where their appearance is not of importance. In construction work these are often parked by the roadside, while at other times they are parked in contractors yards without cover. In fact, the general rule appears to be to regularly house vehicles the finish of which must be maintained and to leave others in the open if it is more convenient.

The airplane or airship, as compared with the automobile, is observed only while the passengers are getting in or out. If a freighter, its finish will never be noticed and in neither case can its appearance be observed closely while it is in flight. Then again, it occupies, when housed, a very considerable amount of floor space even if its wings are folded. In every way it presents an excellent comparison with railroad equipment.

Hangars Were Formerly Shops

In the early days of aeronautics, so much repair work was constantly being done that the hangar was an essential. Every hangar was a small factory and, indeed, most airplanes and airships were actually built in their hangars. In the case of large commercial airlines, such as are being developed today, this condition is passing. So far as airplanes are concerned, it has already passed. The airplanes are built in regular factories and shipped, by air, rail or road, to the field. Shipping by air has become quite customary and it is probable the factory of the future will be located adjoining a field so that a large part of its output may be delivered in this way. Each field is, today, equipped with several hangars and the major part of the maintenance work is usually centered in one of these buildings which becomes regarded as the workshop. The evident tendency toward more and more centering of the work into one building, in this way, is a most logical development.

It seems certain that, in time, all of the work will be thus centered at transportation fields, if only in the interest of efficiency. When this stage is reached, the other hangars will be used only for two purposes: first, storage of machines and, second, for the housing of machines undergoing inspection.

Reduction Possible by Elimination of Storage Hangars

If a comprehensive service is to be operated, storing of airplanes not in use will call for considerable investment in buildings. This becomes a serious matter with any transportation firm, both because of the additional capital necessary

DON'T MISS IT!

THE GREATEST FLYING MEET IN HISTORY!

NATIONAL AIRPLANE RACES

at DETROIT, MICHIGAN

OCTOBER 7th, and 12th, 13th and 14th, 1922

Endorsed by the Secretary of War and the Secretary of the Navy
Sanctioned by all the Aeronautic Bodies.

THE UNITED STATES ARMY AIR SERVICE AND THE NAVY BUREAU OF AERONAUTICS HAVE CONFIRMED ENTRY OF MORE THAN FIFTY OF THEIR LATEST AND FASTEST PLANES.

PRINCIPAL EVENTS INCLUDE THE

CURTISS MARINE FLYING TROPHY RACE, OCTOBER 7th,

PULITZER TROPHY RACE, *(Speed Classic of the World)* OCTOBER 14th,

The Detroit News Aerial Mail Trophy Race for Large Capacity Multi-Motored Airplanes, October 12th.

The Aviation Country Club of Detroit Trophy Race for Light Commercial Airplanes, October 12th.

The Liberty Engine Builders' Trophy Race for 2-Passenger (Observation Type) Airplanes, October 13th.

New planes ***New motors***

OTHER AERIAL CONTESTS AND EXHIBITIONS

$10,000 IN CASH PRIZES

$30,000 IN GOLD AND SILVER TROPHIES

DETROIT AVIATION SOCIETY, INC.

4612 WOODWARD AVENUE,

DETROIT, MICH.

Officers

Sidney D Waldon, President
H. W Alden, Vice-President
Mason P. Rumney, Secretary
William E. Metzger, Treasurer
Harold H. Emmons, Counsel

Directors

H W. Alden	W. H H. Hutton, Jr.	Mason P Rumney
Chas T. Bush	Henry B Joy	Wm E. Scripps
Howard E. Coffin	Angus McLean	Jesse G. Vincent
Harold H. Emmons	Wm E. Metzger	Sidney D. Waldon
Edsel Ford	E. LeRoy Pelletier	C Harold Wills

TEN REASONS WHY

YOU SHOULD ATTEND

THE SECOND NATIONAL AERO CONGRESS

at DETROIT, MICHIGAN

DURING THE NATIONAL AIRPLANE RACES

OCTOBER 12th, 13th, and 14th, 1922

One —Aviation is the new great arm of the national defense, and you as an American are vitally interested in developing this powerful weapon to defend your country and your home. The nation that commands the air shall control the surface on land and sea.

Two —The science of flight is your new medium of travel and transport. You must follow its progress if you are awake to the new era in communication.

Three—The greatest number of new and modern planes ever assembled at a flying event will give you first hand information about the remarkable development of aircraft.

Four —Representatives of the National Air Association, the Aero Club of America, and hundreds of prominent men are co-operating in the preliminary work of the Second National Aero Congress.

Five —The Second National Aero Congress is called to create an American aeronautic association which shall represent your thought and echo your voice here and abroad, in all fields of business and in the halls of your Municipal, State and National legislatures.

Six —You will have an active part in drafting the Constitution and By-Laws of this great representative organization. Your hand shall help write its policies, your efforts control its activities.

Seven—An Advance Committee on Organization is preparing an elaborate program for your consideration and approval.

Eight —Local committees are at work on details of the congress, to the end that your visit to Detroit may be replete with activities combining entertainment with convention business.

Nine —Reunions of flying squadrons are being held. Meet your buddies at the Second National Aero Congress.

Ten —Reduced railroad rates have been obtained. Your ticket agent can explain those details. Reservations can be arranged for you at Detroit's leading hotels where you will meet your co-workers and friends in aviation, and make acquaintances among the new arrivals in this constantly growing force, which believes, with Orville Wright, that "America, the birthplace of aviation, should lead the world in flight".

For further details write

The Advance Committee on Organization

SECOND NATIONAL AERO CONGRESS

4612 Woodward Avenue, DETROIT, MICH.

307 Mills Building, WASHINGTON, D. C.

and because of the additional interest on the investment which must be earned. With two airlines in close competition and cutting their rates, the one to save the last dollar on operating expenses will drive the other out of business. Consequently, the carrying of any avoidable hangars may be a very important item even if not one of the largest sources of expense.

With a line operating on a large scale, it is probable that 50 to 75 per cent of the building space at its fields would be used solely for live and dead storage, were all of the airplanes housed. Erecting several buildings at one time, without heat or plumbing, using the simplest lighting system and the cheapest floor, such as cinders, these buildings will cost $1.10 to $1.25 per square foot. At present this is small in comparison with the cost of the machines which they house, being possibly not much over 10 per cent of the latter. But it must be kept in mind that the cost of buildings is stabilized and there is little hope of reducing the above figure. On the other hand, the cost of airplanes will drop steadily as soon as the factories find enough demand to justify continuous operation. Thus the relation of the building and equipment costs will change.

It is very probable that the proportion required to provide buildings for housing airplanes will increase until it reaches 25 per cent or more of their cost. Before we even approach this condition, the housing of machines will have become a very serious load. It may well be imagined what would become of the railroad that invested 15 to 25 per cent of the value of its cars in buildings for housing them.

Flying Boats Seldom Housed Now

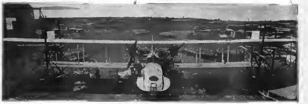
On account of the inconvenience of hauling flying boats out of the water every day, airline operators, and even other private owners, are gradually adopting the custom of mooring these out on the surface of the water. Boats thus moored out have been found to stand the exposure well and to require only a little more attention than if housed indoors.

The Aeromarine Airways go even further than mooring out machines, for all of their maintenance work, except doping of wings, is done in the open. No hangars whatsoever are used on this firm's Florida lines. While it is true that weather conditions down there permit working out-of-doors to an extent not practicable further north, it is equally true that the propellers and hulls are more subject to deterioration by exposure to the hot sun than they would be in the north. It was therefore interesting to learn that this firm is having no trouble with its machines through the unusual amount of exposure. As the Aeromarine line is probably the most successful privately operated airline in the world, its complete elimination of the hangar is particularly significant. The accompanying illustration shows the method adopted by this firm for storing machines which have been hauled ashore.

There is no inherent reason why flying boats should withstand exposure better than land machines, excepting that they are usually slightly better weatherproofed. Now that it has been demonstrated by the Aeromarine Airways, as well as by many smaller operators, that flying boats can be moored out-of-doors without deteriorating rapidly, it is time to consider the adoption of this same practice with land machines.

Land types of airplanes can be securely fastened down to the field by means of stakes, or rings set in concrete blocks, and the propellers, cockpits, engines, etc., covered with tarpaulins. If in intermittent use, it would not be necessary to take special precautions other than covering and securing. If they are to be stored for some time, it would be advisable to cover all of the wings with tarpaulins and to grease any parts which may be exposed to rust. The cost of such storing of machines would be negligible compared with the cost of housing them in hangars.

If the machines are properly waterproofed, the wings either covered or the dope protected against sunlight by suitable pigments, and regular inspections made, little trouble with deterioration should be experienced. Some minor troubles may be experienced at first until the most effective protective coverings, tarpaulin covers, mooring means, etc., are developed, but these should not give very serious trouble. Far greater problems than the building of weatherproofed machines have already been met and overcome.



Aeromarine flying boat of the Santa Maria class, being set up in the open after a complete overhauling at the Aeromarine factory

A Compromise Policy

Nevertheless, the writer seriously questions the advisability of generally going so far with this proposition as the Aeromarine Airways do in eliminating buildings completely and doing all work in the open. This may be practicable in southern climates, but it certainly does not appear practicable in the northern states.

For most purposes, the best practice would appear to be that, followed by the railroads, of providing shops for inspection and overhaul while storing in the open air all equipment not undergoing either. At any fields where inspection or overhaul work is not contemplated, the buildings could then be limited to an office building and a gasoline house. If sectional, bolted-up, buildings were used for these purposes, it would be a very simple and economical job to move all of the field equipment to another site if desired.

Lest the suggestions made in this article be misunderstood, I wish to emphasize certain points: (1) Present airplanes will deteriorate somewhat if moored out. (2) The special finish and other precautions are essential. (3) The mooring system is chiefly suited to large scale operation where machines being stored can be separated from those being inspected or overhauled. (4) The practicability of mooring will be affected by local weather conditions.

The Gordon Bennett Cup Race

The eleventh Gordon Bennett Balloon Race, which started Aug 6 from Zurich, Switzerland, was badly handicapped and nearly spoiled by violent thunderstorms and snow squalls which caused several of the balloonists to land inside Switzerland only small distances over the frontier. Those who were able to weather the storms and the overload due to rains, drifted into Hungary and Czecho-Slovakia.

No decision as to the winner of the James Gordon Bennett Cup had been announced up to the time of going to press. The committee for the James Gordon Bennett Cup race had not decided whether M. Demuyter, pilot of the balloon Belgica, or Capt. H. E. Honeywell of the American team won the race. The committee will await Demuyter's return from Ocnitza, Rumania where he landed, before making a final decision.

The committee will delay its decision it was announced, until the log of Demuyter's flight has been officially examined.

The principal question to be decided is whether Demuyter should be disqualified because his balloon, after making one landing, escaped without an occupant when a guide rope broke and floated away for a considerably greater distance. If the Belgian pilot should be disqualified, it is believed Capt. H. E. Honeywell, the American pilot, who covered a distance of 875 kilometers, will be declared the winner. Both Capt. B. E. Honeywell, pilot, and J. Wade, assistant pilot, of the American balloon Uncle Sam, were indisposed for several days after they landed at Tapio-Gyorgyev, Hungary, the following evening, having flown 875 kilometers, during which they were buffeted about in electrical and rain storms. A message from Captain Honeywell, filed in Budapest was as follows:

Start of the Uncle Sam

"The Uncle Sam made a perfect start in a northeast direction over Lake Geneva. Passing Berne and Lucerne, we were caught in three severe electric and rain storms, losing much ballast. Zurich was reached at midnight, and the Bodensee, on the German border, at an altitude of 8,000 ft., flying easterly, at 5 o'clock Monday morning. After passing Munich and Oberammergau we crossed over the Mountain Hachschwash at 8 o'clock at an altitude of 17,000 ft. At 9 o'clock the Danube was in sight. We suffered considerably here, and oxygen had to be taken.

"After this our progress was slow in an easterly direction. Budapest was reached at 4 o'clock Monday afternoon, and at 7 o'clock that evening we came down at Tapio-Gyorgyev among pleasant but underfed peasants and were royally entertained by landlord Adam Fluck."

The committee may eventually appeal to the International Committee in Paris for a ruling on this question.

It was also announced that the expenses in connection with holding the race would amount to $40,000 and that there would be a deficit of $10,000.

Landings as reported by Gordon Bennett Contestants
Unofficial

American Team

H. E. Honeywell (3rd in 1912 G.B. race, 2nd in 1920 race) Landed at Tapio-Gyorgyev, East of Danube, Hungary, (875 kilometers.)

Maj. Oscar Westover (winner Nat'l Ball. Race 1922), ball. U. S. Army. Landed at Csörotnek, Hungary (90 miles from Budapest).

Lt. W. F. Reed, balloon U. S. Navy. Landed 8 km. N. E. of Pappenheim, Bavaria.

Belgian Team

Capt. E. Demuyter (Winner 1920 G.B. race), ball. Belgica. Landed Ocnitza, Roumania.

Lieut. F. Labrousse, ball. Ville-de-Bruxelles. Landed near Steinamanger, Hungary.

Captain Georges, ball. Zelick. Landed N.E. of Friedrichshafen, on Lake Constance.

British Entry

Griffith Brewer, ball. Bee. Landed near Zurich, forced down by heavy rains.

French Team

Maurice Bienaime (Winner 1912 G. B. race), ball. Picardie. Landed near Mor, Hungary (40 miles W. of Budapest)

Georges Cormier, ball. Anjou. Landed near Eisbenthen, Austria (near Salzburg).

Jules Dubois, ball. Savoie. Landed near Rossbach, Czechoslovakia (near German frontier).

Italian Team

Major Barbanti, ball. Trionfale-VI. Landed near Poysdorf, 30 miles N. of Vienna, Austria.

Maj. G. Valle, ball. Trionfale-IX. Landed near Wiener-Neustadt, 15 miles W. of Vienna.

Capt. A. Gogbelnetti, ball. Aerostiere-III. Landed near Salorn, Czechoslovakia.

Spanish Team

E. Magdalena, ball. Jesus F. Duro. Landed near Grand Saconnex, Switzerland.

F. M. Sanz, ball. Pola. Landed at Sempach, Switzerland (near Lucerne).

Swiss Team

Maj. Paul Armbruster (Winner 1921 G.B. race). Landed near Karlschlag, Austria.

Maj. Gerber, ball. Zurich. Landed near Salzburg, Austria.

Lieutenant Ansermier, ball. Azuren. Landed in forest in Upper Bavaria.

Goodrich Re-Enters Aeronautical Field

The B. F. Goodrich Rubber Co. has announced its intention to resume the development and sale of aeronautical rubber products. The company's activities in this direction will embrace every field of aeronautics, including supplies for both lighter-than-air and heavier-than-air craft.

It will be remembered that during the war Goodrich was very active in this field producing various types of balloons and large quantities of tires and supplies for the government. The present decision to resume aerial operations has resulted in the addition to the company's personnel of Henry Wacker, who was formerly connected with the Curtiss Aeroplane & Motor Corp., and more recently with the Air Mail Division of the Post Office Department.

Capt. Gago Coutinho (left) and Capt. Sacadura Cabral, after their arrival in Pernambuco, Brazil; their first stop on the South American mainland

The Goodrich company's resumption of activities in this field is significant of its belief in the future of the aircraft industry. With the experience gained during the war period, the company is well fitted to continue the development of this line of industrial merchandise.

Kansas City Airport

As a culmination of months of efforts a recent wire received from Maj. Gen. Mason M. Patrick, Chief of Air Service, makes it possible for Kansas City to be one of nine leading American cities in which the Air Service will place an airdrome for the use of the Army, Post Office Department, Reserve Pilots and National Guard and civilian enterprises. A site containing 153 acres is being purchased and will be converted into a first class airport. The tract is situated a few hundred feet south of Blue Ridge Blvd on the Davenport Rock Road (Old Santa Fé Trail), 5½ miles from the center of the city by airline.

The government proposes to use this field as an Air Service station for the training and refreshing courses of the Reserve and National Guard as well as the Air Mail. The Quartermaster is now taking bids on the erection of the Government buildings on the field. The site of the proposed field has been inspected by Maj. Ira A. Rader of Ft. Crook, Neb., the Corps Area Air Officer, and Capt. St. Clair Street, who is on the National Airways Board in Washington. Both these officers were highly pleased and gave most favorable recommendations which have been since acted upon.

When this plan is realized Kansas City is the second city to benefit by the government's cooperation, Boston being the first. An Air Service officer will be in charge of all flying at the Field, and the flying rules laid down by him will prevail. This will eliminate the possibility of the use of unsafe equipment by incompetent pilots and the public will be assured of the pilot's ability and the airworthiness of his craft.

The proposed airport is sponsored by the following group of men whose past experience and knowledge fit them particularly for this work: Rogers Crittenden, with the Plaster Insurance Co.; Frederick H. Harvey, with Fred Harvey, Inc.; Robert R. Lester, with Ridenour Baker Gro Co.; Howard F. Wehrle, with The Kinnear Manufacturing Co.; Simpson Yeomans, with the J. C. Nichols Inv Co. These men have committed themselves to undertake to meet the government requirements by providing the necessary field, arranging for its financing, superintending its construction and commercial activities.

The efforts of these men to establish a Kansas City air terminal and the financing plan to make it possible have been indorsed by the Chamber of Commerce and the Flying Club of Kansas City.

Two companies are provided for—a land company to purchase and hold title to a 153-acre tract, and an operating company to lease the ground from the land company and operate the flying field in conjunction with the United States government.

During the last four weeks fifty-eight Kansas City business firms and individuals have subscribed $65,000 worth of stock in both the land company and the operating company of the Kansas City air terminal association, and it is confidently expected that the total capitalization of $100,000 required for the project will be subscribed before long.

Major Wehrle is particularly equipped successfully to direct a project of this kind. Having learned to fly at the Curtiss School in April, 1916, he was called into the Service of the United States Army in July of that year. In the course of his various duties he assisted in laying out and superintended the construction of Hazelhurst Field at Mineola, N. Y., the first government school in the East and the second in the United States. Many of his ideas, as worked out at Hazelhurst, were embodied in the construction of the twenty-four aviation schools built throughout the country during the war.

Plans have been made for various commercial activities which naturally grow up around a large Government Airdrome, namely: Provisions for Commercial Airline terminal facilities, storage, service and repair for ships, for the lease of a portion of the property to a school of aviation where the layman may be taught to fly. All the activities will enjoy the advantage of centralized control and efficient supervision.

It is furthermore expected that the Flying Club of Kansas City will erect a Club House on the field.

Recent Developments and Outstanding Problems

N.A.C.A. Report No. 132

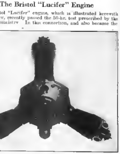
This report, by Franklin L. Hunt, which is the concluding number of a series of reports on aeronautic instruments, discusses briefly some of the more recent developments in aeronautic instrument design and mentions some of the outstanding problems.

The different types of instruments are discussed as far as possible in the order in which they are described in the preceding reports. Among the instruments considered are precision altimeters and barographs, a thermometric altimeter which automatically corrects for the effect of air temperature on altitude readings, rate of climb recorders, a combined statoscope and rate of climb indicator, low speed air-speed indicators for lighter-than-air craft, ground speed indicators, gyroscopic turn indicators, navigating instruments; also special investigations relating to the altitude effect of air-speed indicators, the properties of elastic diaphragms, Bourdon tubes and bimetallic bars and ink substitute for recording instruments.

Among the outstanding problems are mentioned the need of navigating instruments for long distance flights and for flying at night and landing in fog, the improvement of oxygen instruments for high altitude flying, and the attainment of greater reliability and precision in all aeronautic instruments.

The Bristol "Lucifer" Engine

The Bristol "Lucifer" engine, which is illustrated herewith in front view, recently passed the 50-hr. test prescribed by the British air ministry. In this connection, and also because the



Front view of the 100 hp Bristol "Lucifer" 3 cyl. radial air-cooled engine

"Lucifer" is the only British air-cooled radial engine of medium horsepower which has passed the experimental stage, the following particulars will be found of interest.

SPECIFICATIONS OF THE BRISTOL "LUCIFER" ENGINE

No. and type of cylinders	3 cyl. radial
Bore	5.75 in.
Stroke	6.25 in.
Displacement	486.936 cu. in.
Compression ratio	4.8 to 1
Normal b.hp. (1600 r.p.m.)	100
Maximum b.hp. (1750 r.p.m.)	120
Fuel consumption	0.510 pt./b.hp.hr.
Oil consumption	0.036 pt./b.hp.hr.
Weight less oil and fuel	324 lb. incl. heater box.
Weight for 6-hr. run	355.82 lb. incl. heater box.

The Improved Liberty Engine

The Liberty 400 hp. aircraft engine which was brought out in this country during the war was designed to fulfill an urgent need for a standardized aircraft engine that could be placed in quantity production at a time when the air forces of the country were expanded from a negligible quantity to a vast fleet of planes. At the time the Liberty engine had the unqualified support of designers and manufacturers in this country, who maintained that it was the best product obtainable in aircraft engines. Foreign critics condemned it in no uncertain terms, and on numerous and varied counts.

In the light of later experience, it has developed that the Liberty was not, as was at first claimed for it, the perfect aircraft engine. It had many inherent faults which contributed to unreliability and caused many failures and forced landings. On the other hand the many good qualities of the engine were such as to stimulate every effort to correct existing deficiencies rather than to turn to new design. To this end the Bureau of Aeronautics, Navy Department tackled the problem, and by starting with the greatest difficulties and working down through to minor faults was able by progressive steps to place at the service of the Naval Air Squadrons engines capable of any duty that might be required of it with a maximum of dependability and endurance.

At the time of the Armistice the Navy had some 4000 Liberty engines representing an outlay of approximately $16,000,000 of government funds. The engines were subject to much unanticipated trouble which necessitated forced landings of frequent occurrence and general overhauls.

Among the difficulties experienced were trouble with breaking of timing gears, excessive oil consumption and fouling of spark plugs, particularly at low speeds. Cylinder jackets also caused considerable trouble from cracking, allowing loss of water, while generator failures were another source of worry. For a time it appeared as if the very design of the Liberty engine was at fault.

The most serious fault encountered was with gear failures and it was to this, that the naval technicians gave first consideration. A redesign of the timing gear was effected and the trouble was completely eliminated. Next the pistons were modified by cutting a groove around the edge of the lower piston ring groove and drilling oil return holes to the inside of the piston. With this change the spark plug troubles were eliminated as it prevented oil from getting into the combustion chamber. It also reduced the oil consumption and as a result of this the oil pressure was raised. With increased oil pressure the bearing life was lengthened and this lengthened the time between overhauls.

In order to eliminate generator failures, a flexible drive was substituted and up to the present time has proved altogether satisfactory in flight test. To prevent the cracking of water jackets, a re-inforcing strip has been welded across the top of the cylinder on the inside of the water jacket; this has given excellent results.

The Liberty engine ignition system had never been entirely satisfactory. Recent changes carried out by the Bureau of Aeronautics include the substitution of a 12-volt ignition system in place of the 8-volt system, whereby the battery cannot discharge so rapidly. It also allows much easier starting.

With the above changes in effect, the Liberty engine has been in use in planes in the operating squadrons throughout the past winter and spring with excellent results. During the recent ferrying of twelve F5L seaplanes from Hampton Roads to Pensacola the performance of the motors vindicated the changes made, for with the exception of one forced landing due to a leaky water jacket, the engines came through twenty-five hours of flying without the slightest trouble.

In a report to the Bureau of Aeronautics the Commander of the Air Squadrons, Atlantic Fleet, pays high tribute to the work that has been done in this connection.

"In general all the modifications to the standard Liberty have proved of great value," says the report. "The increase in oil pressure has probably doubled the life of the motor." The use of heavy gears has eliminated trouble from this source provided the commanding officers will give their power plants the ordinary care accorded steam power plant machinery. The introduction of 12-volt ignition has been a distinct step in advance. Even with the poor batteries which were known to have deteriorated in storage, ignition troubles were practically eliminated. The addition of all the weights to the engine has more than been compensated for by the reduction in the weight of the spares to be carried.

As a general result of the winter work, the Commander of the Air Squadrons is convinced that the improvement in material is such that the time is fast approaching when forced landings and delayed starting can no longer be blamed on material but the responsibility therefore can be placed squarely up to the operating personnel.

The alterations and changes in the Liberty engine which have been effected were under the direction of Lieut. Comdr. S. M. Kraus, and Lieut. B. G. Leighton of the Bureau of Aeronautics and letters commending their work in this connection have been addressed to them by the Chief of the Bureau.

The Blitz-Stupar ES1 commercial airplane (2-80 hp Le Rhône engines)—a quarter side view showing details of engine mounting

"Who's Who in American Aeronautics"

The biographical sketches of men who are prominent in American Aeronautics are printed periodically in AVIATION. The first series have been published in a more durable form, and revised issues will be published from time to time to take care of the frequent changes in station of Army and Navy officers, and such other changes as may occur. As errors and omissions are liable to occur in a compilation of this character, interested parties are requested to notify "Who's Who" Editor of the necessary corrections so the record may be kept up to date.

Mark Miller Hurd

HURD, MARK MILLER, Commercial Aviation; born Minneapolis, Minn., May 11, 1892; son of Johan Hurd and Mary L. Hurd; married Sarah Rowley Rush June 6, 1915.

Educated: Public schools of Minneapolis; East High School of Minneapolis; two years at University of Minnesota.

Professional: Building Contractor before the War; Bridge Contractor June 1920 to Nov. 1920; Nov. 1920 to date Commercial Aviation.

Aeronautical Activities: Nov. 1917, entered Ground School Urbana, Ill., as Cadet in Aviation Section Signal Corps; primary flying training at Gerstner Field; advance training at Post Field, Taliaferro Field and Issoudun, France; discharged from Army Jan. 1919; became associated with Harold G. Peterson Nov. 1920 in commercial aeronautics and in Feb. assumed position as manager of the Aero Club of Minneapolis; Dec. 1921 assigned to 471st Obs. Squadron O.R.U.S.A. as Adjutant.

Flying Rating: Reserve Military Aviator, May 1918.

War Service: Signal Corps, U. S. Army, Sept. 1917 to Jan. 1919.

Member: Aero Club of Minneapolis; American Legion; Honorary Member Great War Veterans.

Present Occupation: Manager Aero Club of Minneapolis.

Address: 95½ S. 10th St., Minneapolis, Minn.

Durston G. Richardson

RICHARDSON, DURSTON G., Commercial Pilot; born Lockport, N. Y., April 22, 1895; son of H. Gardiner Richardson and Maud Durston Richardson.

Educated: Buffalo, N. Y. Public schools and High School.

Professional: Y. M. C. A. Physical Director four years Buffalo, N. Y.; selling and banking experience two years.

Aeronautical Activities: Cornell Ground School, July 20 to Sept. 20, 1917; primary instruction Selfridge Field, Mt. Clemens, Mich., Oct. and Nov. 1917; Commissioned 2nd Lt. Air Service Feb. 17, 1918, Gerstner Field, Lake Charles, La.; instructed pursuit training Lake Charles; stage Commander Dorr and Carlstrom Fields, March 1918 until Armistice; promoted to 1st Lt. Air Service Sept. 15, 1918; discharged April 1919 and from May 19 that year until June 1923 organized and instructed the Cuban Army Air Service; also organized commercial aviation company in Havana; from May 1923 to date pilot for Aeromarine Airways, Inc.

Flying Rating: Reserve Military Aviator.

Member: American Legion.

Present Occupation: Pilot with Aeromarine Airways, Inc.

Address: 1800 Times Bldg., New York City; home 264 Whitney Place, Buffalo, N. Y.

A. Rolstan Stalb

STALB, A. ROLSTAN, Aeronautical Engineer; born Elizabeth, N. J., June 24, 1894; son of Arthur H. Stalb and Martha E. (Willing) Stalb.

Educated: Battin High School, Elizabeth, N. J. 1911; Webb Institute of Naval Architecture and Marine Engineering 1915.

Aeronautical Activities: Aeronautical draftsman, Navy Department, Washington Navy Yard, Washington, D. C. 1915-1916; aeronautical draftsman Navy Department, Naval Air Station, Pensacola, Fla. 1917; aeronautical engineering Navy Department, Naval Aircraft Factory, Philadelphia, Pa. 1918; aeronautical engineering, Loening Aeronautical Engineering Corp., New York, 1919 to date.

War Service: Lieutenant (j.g.) U. S. Naval Aviation; assigned to engineering duty Naval Air Station, Norfolk, Va. 1918-1919; Bureau Operations, Navy Department, Washington, D. C. 1919.

Member: Aero Club of America; Society of Automotive Engineers.

Present Occupation: Designing engineering, Loening Aeronautical Engineering Corp., New York.

Address: 31st Street and East River, New York City; home, 122 Stiles Street, Elizabeth, N. J.

Robert Dudley Kirkpatrick

KIRKPATRICK, ROBERT DUDLEY, Lieut. U. S. N.; born Georgetown, Texas, July 28, 1891; son of Charles F. Kirkpatrick and Elizabeth (Snyder) Kirkpatrick; married Dorothy Lucille Whiddon Oct. 10, 1917.

Educated: Public schools San Angelo, Texas; U. S. Naval Academy, Annapolis, Md., graduated with class of 1913.

Professional: Commissioned Naval Officer since June 7, 1913; on armored cruiser Maryland until April 1914; Engineering Executive Officer torpedo boat destroyer Hull, April 1914 to Sept. 1917; miscellaneous Naval duties in 1919; entered Naval Aviation April 1, 1919; obtained first instruction at Pensacola, Fla.; on duty Navy Department from Dec. 1917 to April 1919; Executive Officer Naval Air Station, San Diego, Calif., June 1919 to Dec. 1919; Commanding Officer Naval Air Station, Pearl Harbor, T. H., Dec. 1919 to date.

Aeronautical Activities: Began instruction at Pensacola, Fla., April 1918; qualified as Naval Aviator June 1918; qualified in free and kite balloons at Akron, Ohio, Feb. 1919; qualified as pilot of B Zero type airships at Cape May, N. J., March 1919.

Flying Rating: Naval Aviator Certificate No. 48 of June 7, 1917.

War Service: Test Pilot to Nov. 1917; in charge of Naval Aviation Personnel and Training, Navy Department, Washington, D. C., Nov. 1917 to April 1919; accompanied Director of Naval Aviation on tour of inspection overseas October 1918 to Dec. 1918.

Present Occupation: Naval Officer.

Address: Naval Air Station, Pearl Harbor, Territory of Hawaii.

Solomon Frank Baker

BAKER, SOLOMON FRANK, Broker; born Council Grove, Kansas, Dec. 29, 1890; son of Frank W. Baker and Catherine (Sherby) Baker.

Educated: Public schools of Council Grove, Kansas; University of Texas, B.M.A., Austin, Texas.

Professional: Aeronautical Corporation Engineer, Lewis Spring & Axle Co., Jackson, Mich.; Detroit Property Lease Broker, Mastell & Bauer, Detroit, Mich.

Aeronautical Activities: School of Military Aeronautics, Austin, Texas 1917; Primary and Advanced Flying Ellington Field, Houston, Texas; Commissioned April 10, 1918, Ellington Field; Camp Dick, Dallas, Texas; School Aerial Observation and Artillery Fire Control, Langley Field, Hampton, Va.; Advanced School of Aerial Gunnery for pilots, Taliaferro Field, Ft. Worth, Texas; was instructor Aerial Gunnery and later Assistant Chief Instructor Aerial Gunnery, Selfridge Field, Mt. Clemens, Mich.

Flying Rating: Reserve Military Aviator.

War Service: Army Aug. 25, 1917 to July 9, 1919.

Member: Aero Club of America; Army & Navy Club (Detroit, Mich.).

Present Occupation: Broker.

Address: 1704 Ulster Building, Detroit, Michigan.

Nimmo Black

BLACK, NIMMO, Commercial Aviation; born Chicago, Ill., Feb. 2, 1899; son of Maxwell C. Black and Mary E. Black.

Educated: Public schools of Chicago, Ill., and Los Angeles, Calif.

Aeronautical Activities: With Curtiss Aeroplane & Motor Corp. at Chicago, Aug. 1919 to Jan. 1920; associated with Lee Wrigley in 1921 to Sept. 1922; included Wrigley Tour; Chicago 1922.

Flying Rating: Reserve Military Aviator, April 1919; Aero Club Certificate No. 8109, Oct. 1919.

War Service: U. S. Air Service, Nov. 1917 to May 1919.

Member: Vice President Chicago Aviation Club.

Present Occupation: President, Nimmo Black Airways, Inc.

Address: 9000 Paterson Ave., Chicago, Ill.; home, 319 Dempster St., Evanston, Ill.

William Rode Davis

DAVIS, WILLIAM RODE, Amateur aviator and aeronautical; A. B.; born Oakland, Calif., Aug. 2, 1895; son of Wm. R. Davis and M. Ozelle Davis.

Educated: Public Schools of Oakland, California; High School; Hitchcock Military Academy; University of Calif.

Aeronautical Activities: Began model experimentation 1909; longest model flight 1700 ft. in 1914, duration 42 sec.; Nov. 1917 Ellington Field, C. O. 43rd Aero Squadron.

Flying Rating: R. M. A.

Member: Allied Fliers Club.

Address: 404 29th Street, Oakland, Calif.

Merritt Lynn Lawton

LAWTON, MERRITT LYNN, Civil Engineer; born Worthington, Minn., Dec. 9, 1895; son of Merritt E. Lawton and Amelia C. Lawton.

Educated: Public schools of Worthington; Wayne College, 1916-1917.

Professional: Civil Engineering.

Aeronautical Activities: School of Military Aeronautics, Berkeley, Calif., Jan. to March 1918; flying training at Rockwell Field, March to May 1918; student officer, Camp Dick; advanced training, Payne Field July to Oct. 1918; France Oct. 1918 to Jan. 1919.

Flying Rating: Aero Club of America Certificate No. 1714, June 1918; Reserve Military Aviator.

War Service: U. S. Army July 1917 to May 1919; 2nd Lt. A. S. A., U. S. A., May 1919 to Jan. 1919.

Member: Aero Club of Minneapolis; Military Training Camps Association; American Legion.

Present Occupation: Civil Engineering.

Address: Bradley Eng. Service, Weber Bldg., St. Cloud, Minn.; home, Aero Club of Minneapolis, Minneapolis, Minn.

Samuel Rex Smith

SMITH, SAMUEL REX, Commercial Artist; born East Canton, Ohio, Jan. 22, 1899; son of Charles W. Smith and Nellie Grace Smith.

Educated: Glenwood Springs, Colo., grade and High School; Art Institute, Chicago, Ill.; Colorado University, Boulder, Colo.

Professional: Musician; Commercial Artist; Commercial Aviator 1920 to date.

Aeronautical Activities: U. S. Army 1917 to 1918; Commercial Aviator 1920 to 1922; first aviator to carry passengers in plane through Grand Canyon of Colorado; specializing in night flying.

Flying Rating: R. M. A. War Service Dec. 15, 1917 to Dec. 9, 1918.

Present Occupation: Commercial Aviator.

Address: Home, 917 Colorado Ave., Glenwood Springs, Colo.

H. Cecil Trevor

TREVOR, H. CECIL, Commercial Aviation; born Saratoga Springs, N. Y., March 24, 1899.

Educated: Country grade school, Greenwich High School; two years at University.

Aeronautical Activities: Amateur flying two years before the war; enlisted in British Royal Flying Corps Sept. 1917, served in Texas, Canada, England and France; commercial flying and exhibition work, 1919; test pilot, 1920; at present engaged in testing and selling airplanes.

Flying Rating: March 19, 1919, No. 29070.

War Service: British Royal Flying Corps, Sept. 1917 to June 1919.

Member: Flying Club of Kansas City; American Legion.

Present Occupation: Airplane Salesman.

Address: Lee's Summit, Mo.

ARMY AND NAVY AIR NEWS

Air Service

Cross-Country Night Flight—The first cross-country night flight ever made in an airplane from Washington to New York City was successfully negotiated by First Lieut. Clayton Bissell, Air Service, one of the few "aces" now on the active list of the Army.

The trip was made on a standard DH4B airplane, the start being made from Bolling Field at 9.30 p. m. The course followed was via Baltimore, Md.; Aberdeen, Md., Wilmington, Del., Philadelphia, Pa., Trenton, N. J., and New York City. The flight from Washington to Baltimore was made without incident and on the entire stretch of this trip the lights of both Washington and Baltimore could be seen. From Baltimore the railroad was followed to the head of the Chesapeake Bay which took Lieutenant Bissell over the Aberdeen Proving Grounds. He then cut across to the Delaware River, found himself in the vicinity of Wilmington, Del., and proceeded along this river to Philadelphia and Camden. The city of Philadelphia looked very beautiful from the air and the lights of Independence Hall could be picked up from a very great distance and constituted an excellent landmark. About fifteen miles north of Philadelphia along the Delaware River, the sky became overcast and indicated the approach of a storm. Lightning flashed intermittently, but as the storm seemed to be moving to the southeast there appeared to be no reason for changing the course. The clouds soon, however, obscured the ground and it was necessary to descend from an altitude of 4000 ft. to about 600 ft. so as to fly underneath them in order to pick up landmarks and not be forced to depend entirely on the compass. This, however, subsequently proved futile as the cloud bank descended lower and lower until the plane was done to 400 ft. altitude. It was then necessary to fly south for a short distance in order to get above the clouds, which at that time were so thick as to render it impossible to see anything on the ground through them. Weather reports had been received to the effect that clear conditions prevailed in New York City, but as local storms had been prevalent in this section throughout the day, some apprehension was felt about going over the clouds and taking a chance of being able to come through in the right place. After having flown about 90 miles by dead reckoning, the plane ascended to a height of between 10,000 and 12,000 ft., from which altitude the lights of Trenton could be seen. This was reassuring for although Trenton was over ten miles away it was positive evidence that clear conditions prevailed in that vicinity. Upon arrival in Trenton, ideal weather condition were found. The sky was still overcast, however, and the moon was not seen again until the plane was over Lower New York Bay. Staten Island, Elizabeth, Jersey City, New York, Brooklyn and the various beach resorts presented a jumble of lights which made it very difficult to pick out landmarks.

The plane flew along the eastern shore of Staten Island, over upper New York Bay, along the eastern part of Jersey City, and across Manhattan in the vicinity of 42nd Street, then directly over Brooklyn and Jamaica and finally to Mitchel Field, Long Island, where a good landing was effected. Landing lights had been installed on the airdrome at Mitchel Field, which renders this station an excellent one for night flying. The personnel at Mitchel Field fired colored rockets which were distinguishable at a considerable distance and proved of great aid to Lieut. Bissell in picking out the field.

The flight from Washington to New York by this slightly roundabout course, including the time lost in the vicinity of Trenton, N. J., consumed 3 hr. 5 min.

After carefully going over the plane in preparation for the return flight, Lieut. Bissell left Mitchel Field at 2.15 a. m., Washington time, flew a straight compass course, and landed at Bolling Field at 4.25 a. m., the distance of 225 miles being covered in 2 hr. 10 min. During this return journey the same cloud bank was encountered in the vicinity of Trenton and entirely obscured the city. It was only recognized, however, by the peculiar light effect on the clouds over the city. Ten miles south of Trenton the sky cleared and the stretch of the trip from Philadelphia to Washington was made under perfect weather conditions.

* * *

Radio Sets for Airships—Plans for the new radio sets to be used on Army semi-rigid airships call for central power stations which would include generators geared to gasoline engines, after the fashion in which a magneto is driven, but never before attempted. The French tried out belt-driven electrical generators, but with little success. However, representatives of the Air Service Engineering Department at McCook Field expect to develop a central power plant that will give sufficient power for putting ½ KW in the antenna and also power for lighting, heat and electrical control work.

The Air Service plans to use the new Signal Corps set 135 combining radiophone and telegraph circuits good for distances up to 75 miles and 200 miles respectively. The range will be greater than is planned for the big Martin Bombers, however, as better facilities for erecting aerials are available on airships than on planes. One method considered is to install the antenna within the envelope, another is to suspend it below the ship, drawing it up upon landing, while a third contemplates hanging the wires of the aerial along the sides and over the top of the ship. Experiments will determine which of these methods is the most efficient.

Naval radio experts are loath to reveal their definite plans for the radio equipment of the ZR ships, but it is said that they may parallel the Army's ideas, although their ships will be about twice the size of the largest Army semi-rigids now planned, giving them more latitude and more room for equipment.

* * *

C2 Transcontinental Flight of Airship—Orders have been issued for the Army airship C2, now at Langley Field, to be placed in the best possible condition for a transcontinental flight to Ross Field, Calif., early in September.

The crew of the ship has been officially designated by the Chief of Air Service, and are—Maj. H. A. Strauss, Commanding Officer, Capt. George W. McEntire; Lieut. O. A. Anderson, Lieut. Don. L. Hutchins; Master Sergeant William E. Fitch, Engrs., and Staff Sergeant Jos. L. Albrecht, Engrs. It is contemplated that the C2 in its flight across the continent, will fly over Washington, D. C.; Akron, Ohio; McCook Field, Dayton, Ohio; Scott Field, Belleville, Illinois; Camp Pike, Little Rock, Arkansas; Love Field, Dallas, Texas; Brooks Field, San Antonio, Texas; Marfa, Texas; Camp Bierne, Texas, and Yuma, Arizona. Stops are planned at Scott Field, Brooks Field and Camp Bierne.

The purpose of the flight is to establish a transcontinental airship route; to photograph an air-way, and at the same time to provide practice for the aeronauts in long distance cross country flights. No attempt will be made to establish any record for speed or endurance.

The C2 is 192 ft. long, 64 ft. wide and 67 ft. high, and has a capacity of 172,000 cu. ft. Hydrogen gas is used. The airship is propelled by two 150 hp. Wright motors and its speed is 65 m.p.h. The ceiling is 8500 ft.

Naval Aviation

New Radio Equipment for Lakehurst—The two largest airships in the world, now building for the Navy, one at Lakehurst, N. J., and one in Friedrichshafen, Germany, will have the latest and best radio equipment capable of development. Anticipating their completion, their home port is being fitted up for their arrival with a high-powered radio station.

A new type of radio transmitting antenna without towers has just been installed at the naval airship base at Lakehurst, N. J., Naval Radio Station NEL. In an effort to keep the big landing field clear for the two big rigids ZR 1 and ZR 3, and to eliminate high towers and aerials, the radio engineers

Official Photo, U. S. Navy

The U. S. S. Wright—balloon carrier and aircraft tender of the Atlantic Fleet

of the Navy designed a long low aerial. It is nearly 800 ft. long and fully 120 ft. wide, forming a sort of gridiron, which is mounted on poles only 60 ft. in height instead of between 150 and 200 ft. Technically it is a multiple-tuned antenna with several ground leads. By erecting the aerial along one side of the field, a clear open space is left for maneuvering the ships.

Recent transmission tests with the new aerial have carried messages on 900 meters to Newport, R. I., and Norfolk, Va., distances approximating 200 and 250 miles, which indicates excellent daytime service. Daytime communication with the big airships when they are cruising within about 300 miles of the station is promised. At present, a vacuum transmitting set with 1 KW in the antenna, is used, and the experts believe that on clear nights in winter communication can be carried on with aircraft or ships fully 2000 miles out on the Atlantic. This will insure the picking up on the German built ZR 3, on her maiden trip to her home port, before she is a third of the way over. When the R38 made her initial trans-Atlantic cruise, she was not heard from until within about 600 miles of New York.

The new aerial was designed and built by the Naval Aircraft Radio Laboratory at Anacostia, and installed at Lakehurst by radio men from the Philadelphia Navy Yard.

In addition to the new radio transmitting set, Lakehurst will have a radio compass station which will enable the airships to determine their position in the air within a radius of 200 miles, and locate the field when returning from a cruise in darkness or in dense fog. Radio equipment for the big rigid ships has not yet been designed, but it is understood that as plenty of room will be available for engine-driven generators producing great transmitting power, a very long range set can be installed, and it is hoped that both radio telegraph and telephone communication can be carried on up to 300 and 100 miles respectively.

Navy Tests of Plywood—During the month of June the Laboratory Section of the New York Navy Yard made numerous tests of plywood intended for use in the construction of airplanes. Due to the inability of contractors to supply the Navy with a product which met with the requirements and specifications, these tests have aroused considerable interest.

Plywood itself consists of laminated layers of wood veneer with the grain of each ply perpendicular to the grain of each preceding or succeeding ply. Its advantages in aircraft construction are readily apparent, as it is comparatively light in weight, has transverse as well as longitudinal strength and resists warping and distortion.

Plywood is purchased for the Bureau of Aeronautics in accordance with Aero Specifications 15-C, which cover three-ply plywood from 1/16 inch to 3/16 inch thick, five-ply plywood from ¼ inch to ½ inch thick, nine-ply from ⅝ inch to ¾ inch thick and thirteen ply 1 inch thick.

The tests of plywood consist solely of shearing tests to determine strength of glue in a three-ply section both when the specimen is dry and wet after submersion in water for 48 hr. Grade A is required to have a minimum dry shearing strength of glue of 300 lb. per square inch and a minimum wet shearing strength of 180 lb. per square inch.

The test specimens are prepared as follows in the New York Yard. Grooves ⅛ in. wide are cut with a fine ⅛ in. abrasive wheel mounted on the Emerson Rubber Testing Machine, which has an extremely fine feed. The grooves are cut through the outer faces and core from alternate sides of the specimen, presenting a cross section similar to the letter S.

The test specimen is cut 1-in. wide and approximately 3 in. long in the direction of the grain of the outer faces. The distance between the grooves is varied and depends upon the thickness of the outer faces which alone in tension resist the shear.

Although numerous tests have been made on various plywoods, not a single specimen has been found which would withstand the wet shear test specified. The Bureau of Aeronautics, however, it is said, has assured the New York Yard that the wet shear requirements are not excessive and can readily be complied with by the use of good qualities of water-resisting glues.

The veneers used in plywood are either rotary cut from the log or, when this is impracticable, as in mahogany, are shaved off on a bias cut from the original log. The grains of the various plies are obviously not uniform, and difficulty has frequently been experienced in obtaining glue shears due to the fact that the faces fail in tension at low strength because of cross grains at the strained sections opposite the grooves.

Radio and the Navy

Editor, AVIATION:

In regard to your editorial in Vol. 13, No. 2, of July 10, 1922, on "Radio in Aeronautics," wherein you mention a radio experience in a recent balloon race, and also state that it comes somewhat as a shock to learn that on its seaplanes the Navy still prefers to use pigeons for their greater reliability in an emergency, and that evidently airplane radio has not yet reached the point of "selling itself" completely, you mention also that it requires:

1. The better protection of the apparatus and provision for using it on the water.

2. The elimination of the telegraph code in favor of direct vocal messages.

3. Improvement in means of directing a beam of radio waves.

In this connection I wish to make the following remarks. In the first place, conditions for reception of radio signals in a balloon, as mentioned in the first paragraph of your article, are absolutely ideal as compared with those of a plane.

As concerns the pigeons that the Navy uses, it is not a case of preference in using these pigeons in an emergency, but merely a matter of good judgment, as the radio apparatus depends on certain means of power for operation and they carry the pigeons merely in case this means of power is gone, which, however, hardly ever occurs, so you see the Navy takes greater precautions by the use of pigeons.

The U. S. Navy today is communicating daily, distances of over 250 miles, with planes in service *on the water*, one call being all that is necessary in order to receive an immediate response from stations called at this distance. As for the protection of the apparatus, water proofing is all that is necessary. The present water-proof method on Navy planes today is absolutely ideal, not one plane being reported in the last year of actual service as being placed out of commission due to becoming wet.

The apparatus in general service has not only one mode of communication, that is, namely: "code," as you call it, but can use continuous wave emission, damped wave emission and the voice. This sounds something like it, does it not? And furthermore, for *military observations*, there *never* will be invented anything more *accurate* than the code method of transmission.

As regards the means of directing a "beam" of radio waves, the advantage of this cannot be seen, as all cases in an emergency, the wider the wave the more positive the response, and as for direction, all planes operating any distance to sea are equipped with radio compasses. The military and commercial value in aircraft radio of a directional wave is, of course, understood and would be of use between ships and for use in trench warfare, but for aviation, the plane must change its course so frequently during a single flight, that it would be impossible to keep the directional beam between two planes or between a ship and a plane or between a shore station on a plane long enough to deliver an intelligible communication. As regards directional work in connection with landing fields, this has already been "doped up," and it will be but a short time when every principal landing field throughout the United States is equipped with a system similar to that used for ships in New York Harbor. This system is even now incorporated in at least two landing fields on the Atlantic Coast.

These facts certainly show that aircraft radio has passed the point of "selling itself." In fact if you should come in contact with any fleet pilots that operate some distance to sea, ask them their opinion of radio and you will find that not one of them will fly to sea unless he is convoyed by another plane or has a radio man aboard, and the set in operation.

W. H. ANTHONY, JR.
Assistant Radio Inspector

• • •

Flying with Difficulties—A small sized hay stack jammed in the control wires of an airplane is not an ideal condition for a comfortable flight and yet this state of affairs was the position of Commander T. G. Ellyson, U.S.N., at the Naval Air Station Anacostia recently.

Commander Ellyson, who was the first naval officer to enter aviation and the first to be shot into the air from a catapult, was taking off in a Navy landplane from the flying field when tail of his plane picked up a small haystack from a newly mowed field. The hay jammed the control wires leading to the tail flippers and several extremely unpleasant alternatives were presented forthwith to the pilot. He could not rise, he dared not nose down, and a turn to the left meant going into a spin. The encumbering haystack prevented him from giving his plane right rudder and there seemed nothing left to do but drive ahead at a landscape which presented an uncomfortable outline of trees and houses.

However, by skilful jockeying of the plane, Commander Ellyson was able to keep her from nosing and at the same time guide her out over the Potomac River in a wide turn which brought her back to the landing field, but here he was balked in his purpose to land by several planes in the way. Another swing several miles across country was necessary, with the planes tail at low altitude and speeding like the wind. This time she was brought down in safety and the Commander called it a day.

• • •

Value of Turn Indicator Demonstrated—Capt. H. C. Mustin, Assistant Chief of the Bureau of Aeronautics, who is one of the oldest and most experienced pilots in the Navy was making a return flight to Washington from Philadelphia in a Vought seaplane, the type that is being placed on battleships, when, on reaching Annapolis, the plane being headed for Washington overland, the pilot ran into dense cloud banks. At this time the engine begun to develop signs of trouble, and from indications led the pilot to believe that water had gotten into the fuel. It was necessary to descend through the thick banks of cloud even though the prospect of landing a seaplane on the ground presented a risky prospect.

In this emergency however, a test was afforded of the gyroscopic turn indicator which has recently been made standard equipment on all types of naval planes.

A high wind, combined with heavy cloud banks and "bumpy" air, combined to give Captain Mustin a practical demonstration of the utility of the turn indicator and by means of it he was enabled to maneuver his plane through the clouds without deviating from the course. This was leading him in the direction of the Potomac River which he hoped to gain before being forced down by complete engine failure. The necessity for making a forced landing was obviated by the engine again picking up speed when the plane was close to the ground and the trip went forward without further incident.

Coming Aeronautical Events

AMERICAN

Date Postponed	*Aviation Meet, Aircraft Exhibition and Aeronautical Congress, Chicago*
Oct. 7	— *Detroit Aerial Water Derby, Detroit. (Curtiss Marine Flying Trophy Competition.)*
Oct. 12-14	— *Detroit Aerial Derby, Detroit. (Pulitzer Trophy Race.)*

FOREIGN

Aug. 6-20	— *Soaring and Gliding Competition, Clermont-Ferrand, France.*
Aug. 9-24	— *Soaring and Gliding Competition, Gersfeld, Germany.*
September	— *Grand Prize of Italy. (International Airplane Competition.) Milan, Italy.*
Sept. 22	— *Coupe Henri Deutsch de la Meurthe. (Airplane speed race.) France. American elimination trials, if required, to be held about Aug. 15, in Mitchel Field, L. I.*
October	— *International Parachute Competition. Rome, Italy.*

Foreign News

Australia—Information as to the present condition of civil aviation in Australia, made available by the Commonwealth Director of Aviation, states that there are now about sixty landing grounds—emergency and otherwise—prepared in different parts of the country. The aim is to have an emergency landing ground every fifteen miles of surveyed routes. These grounds are about 350 yd. square, and are marked in the center by a large outline circle in white. When more funds are available it is intended to store supplies of gasoline and to employ caretakers at each of the principal landing places. The government vote last year for civil aviation was £98,000 and it has been indicated that next financial year a larger sum will be placed on the estimates.

At present there is only one aerial mail service in operation, between Geraldton and Derby on the northwest coast of Western Australia, the distance between the two places being about 1200 miles with five intermediate stops. This service is claimed to be 100 per cent efficient, every trip during the past five months having been carried out according to schedule. Contracts have been let for services between Charlesville and Cloncurry in Queensland, and between Sydney and Adelaide, and Sydney and Brisbane. It is expected that the Queensland service will be commenced next August, and the other services when additional machines arrive from England.

When all the services already tendered for are in operation, the extent of country to be traversed will be 3020 miles.

• • •

Denmark—The Danske Luftfartselskab (Danish Air Transport Co.) having obtained official guaranty for one-half of a possible deficit, is arranging express traffic connections with Central Europe. The company is to take certain mail in exchange for the government's promise of assistance.

The daily service to Hamburg can take 300 kg. of freight or three passengers, but the route is established only with the idea of taking freight and mail. Germany will furnish three and Denmark three of the machines used on the Copenhagen-Hamburg line. The Danish planes are rebuilt and improved DeHavilands.

• • •

Italy—According to London newspapers, Signor M. G. Pegna, the Italian airman, has designed a 5 hp. single-seater airplane, which it is claimed will be the smallest flying machine in the world. The machine has a single lifting wing, designed from data secured in motorless gliding, and this is easily detachable, so that the machine can be garaged in quite a small shed. The airplane is now being built in Rome, and is to be fitted with an engine designed to facilitate mass production.

Bombing Maneuvers at Galveston—A crowd, variously estimated between 25,000 and 90,000 people, witnessed the bombing of the schooner Navided off Fort Crockett, Galveston, Tex., recently by the First Pursuit Group. The bombing was done with dummies of tile, since the live bombs obtained could not be used in racks of the type with which the ships are equipped. Even so, the last attack left the Navided on fire in the hold, to burst into flames upon the withdrawal of the planes. The opening attack was made with two 5-ship formations of Spad XIII's dropping four 25-pounders and getting a very creditable percentage of hits on deck, in spite of the fact that the minimum altitude for live bombs were adhered to. The Spads were followed by a formation of five DH4B's from Kelly Field dropping full loads of 25-pounders.

It was obvious to any observer that, if bombs of the types ordinarily used against craft of this type had been employed here, every seam in the hull would have been wide open to the sea after the DH's were half through. This attack was followed by two formations of SE5's dropping 4 bombs each, 3 of the planes remaining to attack with machine guns.

The First Pursuit Group expects to have more of this sort of thing at Selfridge Field, the unused shallow portions of Lake St. Clair offering a convenient location for either practice or demonstration.

INDEX TO ADVERTISERS .

CLASSIFIED ADVERTISING

10 Cents a word, minimum charge $2.50 payable in advance. Address replies to box numbers, care AVIATION, 225 Fourth Ave., New York.

FOR SALE—Lincoln Standard, new surfaces, excellent motor, ship like new, $1700 00, best SVA in USA, motor completely overhauled before test flight, total time not over thirty hours, $1800 00; Curtiss JN6H, new covering, excellent condition, $1200 00, OX5 Standard, has had 25 hours, finest condition, $1000 00. All these planes are ready to fly and airworthy. None have been crashed. Hurry for bargains. Address 1018 Commerce Bldg, K. C. Mo.

The Aircraft Service Directory

WHERE TO PROCURE EQUIPMENT AND SERVICES